Amendments to the Claims

1-20. (canceled)

21. (currently amended) The optical imaging system of claim ~~20~~56, wherein an image-side numerical aperture (NA) of the optical imaging system is 0.6.

22. (currently amended) The optical imaging system of claim ~~20~~56, wherein an image height on the surface is at least 10 mm.

23. (currently amended) The optical imaging system of claim ~~20~~56, further comprising a reflective surface arranged to direct a light flux from the catadioptric optical system to the refractive optical system.

24. (currently amended) The optical imaging system of claim ~~20~~56, wherein the refractive optical system includes an aperture stop.

25. (currently amended) The optical imaging system of claim ~~20~~56, wherein the aspheric optical surface is a refractive optical surface.

26. (currently amended) The optical imaging system of claim ~~20~~56, wherein the aspheric optical surface is a reflective optical surface.

27. (currently amended) An exposure apparatus comprising:

a laser situated to illuminate a reticle;

a substrate; and

the optical imaging system of claim ~~20~~56, situated and configured to form an image of the reticle on the substrate.

28. (canceled)

29. (currently amended) The optical imaging system of claim ~~28~~57, wherein an image-side numerical aperture of the imaging system is 0.6.

30. (currently amended) The optical imaging system of claim ~~28~~57, wherein an image height on the surface is at least 10 mm.

31. (currently amended) The optical imaging system of claim ~~28~~57, further comprising a reflective surface arranged to direct a light flux from the catadioptric optical system to the refractive optical system.

32. (currently amended) The optical imaging system of claim ~~28~~57, wherein the refractive optical system includes an aperture stop.

33. (currently amended) The optical imaging system of claim ~~28~~57, wherein the aspheric optical surface is a refractive optical surface.

34. (currently amended) The optical imaging system of claim ~~28~~57, wherein the aspheric optical surface is a reflective optical surface.

35. (currently amended) An exposure apparatus comprising:

a laser configured to direct an ultraviolet flux to a reticle;

a substrate; and

the imaging system recited in claim ~~28~~57, situated and configured to form an image of the reticle on the substrate.

36. (currently amended) The optical imaging system of claim ~~20~~57, wherein the aspheric surface is configured to compensate a high order aberration.

37. (previously submitted) The optical imaging system of claim 36, wherein the aspheric surface is configured to compensate at least one of distortion and astigmatism.

38. (currently amended) The optical imaging system of claim ~~20~~56, wherein the aspheric surface is configured to compensate at least one of distortion, pupil spherical aberration, manufacturing error, and astigmatism.

39. (previously presented) The optical imaging system of claim 38, wherein the aspheric surface is axially symmetric.

40. (previously presented) The optical imaging system of claim 38, wherein the aspheric surface is axially asymmetric.

41. (currently amended) The optical imaging system of claim ~~20~~56, wherein the aspheric surface is axially symmetric.

42. (previously presented) The optical imaging system of claim 41, wherein the aspheric surface is configured to compensate at least one of distortion, pupil spherical aberration, and manufacturing error.

43. (currently amended) The optical imaging system of claim ~~20~~56, wherein the aspheric surface is axially asymmetric.

44. (previously presented) The optical imaging system of claim 43, wherein the aspheric surface is configured to compensate at least one of astigmatism and manufacturing error.

45. (currently amended) The optical imaging system of claim ~~20~~56, further comprising a first reflective surface situated to direct a light flux from the catadioptric optical system to the refractive optical system.

46. (previously presented) The optical imaging system of claim 45, further comprising a second reflective surface, wherein the refractive optical system comprises a first

lens group and a second lens group, and the second reflective surface is situated between the first lens group and the second lens group.

47. (currently amended) The optical imaging system of claim ~~20~~56, wherein the catadioptric optical system comprises a concave mirror and at least one diverging lens situated so that optical radiation from the object is directed through the diverging lens to the concave mirror, and directed from the concave mirror to the diverging lens.

48. (previously presented) The optical imaging system of claim 47, wherein the catadioptric optical system comprises at least four lens elements.

49. (currently amended) A projection-exposure method, comprising:
illuminating a pattern; and
imaging the pattern on a substrate with the optical imaging system of claim ~~20~~56.

50. (previously presented) A projection-exposure method, comprising:
illuminating a pattern; and
imaging the pattern on a substrate with the optical imaging system of claim 23.

51. (previously presented) A projection-exposure method, comprising:
illuminating a pattern; and
imaging the pattern on a substrate with the optical imaging system of claim 24.

52. (previously presented) A projection-exposure method, comprising:
illuminating a pattern; and
imaging the pattern on a substrate with the optical imaging system of claim 27.

53. (previously presented) A projection-exposure method, comprising:
illuminating a pattern; and
imaging the pattern on a substrate with the optical imaging system of claim 29.

54. (previously presented) A projection-exposure method, comprising:

illuminating a pattern; and

imaging the pattern on a substrate with the optical imaging system of claim 31.

55. (canceled)

56. (new) An optical imaging system configured to form an image of an object, the optical imaging system comprising:

a catadioptric optical system having an optical axis and a refractive optical system situated downstream of the catadioptric optical system along the optical axis;

the catadioptric optical system being configured to form an intermediate image of a predetermined area of the object, wherein the predetermined area of the object and the intermediate image are displaced from the optical axis on first and second sides, respectively, of the optical axis in a manner by which light flux propagating to the catadioptric optical system from the object is separated from light flux propagating downstream of the catadioptric optical system to the refractive optical system;

the refractive optical system being configured to form an image of the intermediate image, wherein the image formed by the refractive optical system is displaced from the optical axis; and

at least one of the catadioptric optical system and the refractive optical system includes an aspheric optical surface.

57. (new) An optical imaging system for forming, on a surface, an image of a predetermined area of an object, the imaging system comprising:

a catadioptric optical system having an optical axis;

a refractive optical system situated downstream of the catadioptric optical system along the optical axis;

the catadioptric optical system comprising a concave mirror and at least one diverging lens, the catadioptric optical system receiving a light flux, from the area of the object located on a first side of the optical axis, and forming from the light flux an intermediate image of the area on a second side of the optical axis, thereby separating the light flux from the area from the light

flux reflected from the concave mirror, the diverging lens being arranged such that the light flux from the area of the object propagates through the diverging lens to the concave mirror and the light flux reflected from the concave mirror propagates through the diverging lens downstream to the refractive optical system;

the refractive optical system being configured to form on the surface an image of the intermediate image, the image being displaced from the optical axis; and

at least one of the catadioptric optical system and the refractive optical system including an aspheric optical surface.

58. (new) An optical system configured to form on a surface an image of a predetermined area of an object, the optical system comprising:

a catadioptric optical system situated, on an optical axis of the optical system, between the object and a point that is optically conjugate to the object, wherein a light flux propagating from the predetermined area on one side of the optical axis is separated by the catadioptric optical system from a light flux propagating downstream of the catadioptric optical system on a second side of the optical axis; and

a refractive optical system situated on the optical axis between the catadioptric optical system and the surface, the refractive optical system being configured to form an image of the predetermined area of the object on the surface at a location on the surface that is displaced from the optical axis, wherein at least one of the catadioptric optical system and the refractive optical system includes an aspheric surface.